# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-013910
(43)Date of publication of application : 19.01.2001

(51)Int.Cl. G09G 3/28
G09G 3/20

(21)Application number : 11-180832
(22)Date of filing : 25.06.1999

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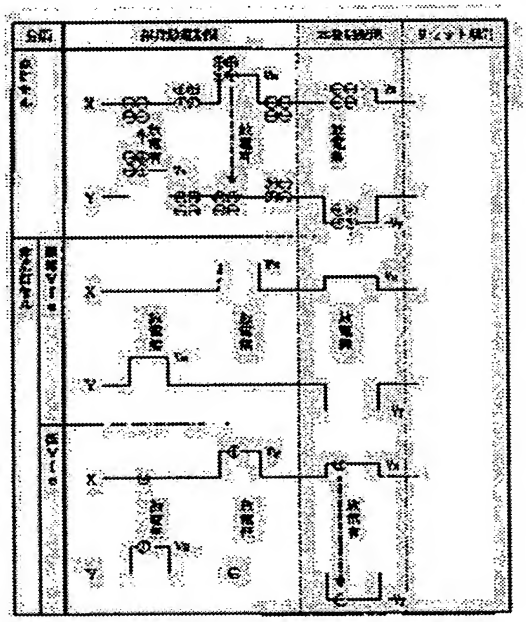
## (54) DRIVING METHOD OF PLASMA DISPLAY PANEL

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain a driving method, which prevents mallighting of a non- turned on cell, by providing a first discharging process that applies a specific voltage between first and second electrodes.
SOLUTION: A low Vfe non-turned on cell is normally in a condition in which no wall electric charge exists b cause no maintaining discharge is conducted during a maintaining discharge period. However, there is a case in which slight amount of wall electric charges exists by the effect of discharges made by the turned on cells located at the top and the bottom and the right and the left of the non-turned on cell. OC pulses have a positive pulse to be applied to an X electrode and a negative pulse to be applied to a Y electrode. The applied voltages are set not to exceed a discharge starting voltage. However, the voltages are added by residual wall electric charges at the completion time of the maintaining discharge period. If the amount of finite wall electric charges is large, the potential between the electrodes exceeds as discharge starting voltage, discharges take place by the OC pulses and wall electric charges are formed. At that time, the cell has approximately the same wall electric charges of a normal turned on cell. Therefore, a complete erasing is conducted by the erasing discharge in a rest period later.



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[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

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* NOTICES *



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CLAIMS

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[Claim(s)]
[Claim 1] While the 1st and 2nd concurrent electrodes adjoin mutually and are arranged, [ two or more ] this -- with the reset period for two or more 3rd electrode being arranged so that the 1st and 2nd electrodes may be intersected, and coming to arrange the electric discharge cell specified in the intersection field of each electrode in the shape of a matrix, and making uniform the wall charge distribution of two or more of these electric discharge cells The address period which accumulates a wall charge in arbitrary electric discharge cells according to an indicative data, and forms a lighting cell, It has the maintenance conducting period which maintenance electric discharge is carried [ conducting period ] out in this lighting cell, and makes this lighting cell turn on. It is the drive method of the plasma display panel which displays by repeating and p rforming this reset period, an address period, and a maintenance conducting period. the aforementioned reset period The first electric discharge process which discharges in the electric discharge cell which is an astigmatism LGT in the last maintenance conducting period, and is accumulating the wall charge, It discharges in the electric discharge cell which is accumulating th wall charge after the electric discharge process of the above first, and the second electric discharge process which eliminates this wall charge is included. the electric discharge process of the above first Are the wall charge and reversed polarity which are accumulated at the aforementioned lighting cell turned on in the last maintenance conducting period, and under by th breakdown voltage in an electric discharge cell and it can set during the aforementioned address -- this -- the voltage beyond the 1st and 2nd inter-electrode potential difference -- this -- the drive method of the plasma display panel characterized by being what impressed to int r-electrode [ the 1st and 2nd ]

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## DETAILED DESCRIPTION

[D tailed Description of the Invention]
[0001]
[Industrial Application] In recent years, in various display units, busy-izing of the information which should be displayed, or installation conditions, big-screen-izing, and highly-minute-izing are remarkable. Therefore, in display, such as a plasma display panel (henceforth, PDP) used for these, CRT, LCD and EL, a fluorescent display, and light emitting diode, improvement in display quality is called for that it should correspond to these inclinations. Development is briskly performed among the above-mentioned display recently from having the high brightness with easy big-screen-izing without a flicker for PDP, and the feature which was excellent in long lasting **.
[0002] There are 2 electrode type which performs selection electric discharge (address electric discharge) and maintenance electric discharge by two electrodes, and a 3 electrode type which performs address electric discharge using the 3rd electrode in PDP. Although the fluorescent substance formed in the electric discharge cell by the ultraviolet rays generated by electric discharge is excited in the color PDP which performs a gradation display, this fluorescent substance has the fault of being weak in the shock of the ion which is the positive charge simultaneously generated by electric discharge. In the above-mentioned 2 electrode type, since it has the composition that a fluorescent substance hits ion directly, there is a possibility of causing the life fall of a fluorescent substance. In order to avoid this, generally in the present color PDP, 3 electrode structures where field electric discharge was used are used. Furthermore, also in this 3 electrode type, it may arrange to the case where the 3rd electrode is formed in the 1st which performs maintenance electric discharge, and the substrate by which th 2nd electrode is arranged, and another substrate which counters. Moreover, even when forming three sorts of aforementioned electrodes in the same substrate, the 3rd electrode may be arranged to the case where the 3rd electrode is arranged on two electrodes which perform maintenance electric discharge, and the bottom of it. Furthermore, the case (penetrated type) where penetrate the fluorescent substance and the light emitted from the fluorescent substance is seen, and the reflection from a fluorescent substance may be seen.
[0003] Moreover, as for the cell which discharges, the spatial combination with a contiguity cell is cut off by the obstruction (a rib, barrier). When this obstruction is established on all sides so that an electric discharge cell may be surrounded, and sealed completely, on the other hand, it may be prepared only for Mukai, and combination may be cut by rationalization of a gap (distance) inter-electrode in another side.
[0004] this invention relates to the drive method of the plasma display panel (PlasmaDisplayPanel:PDP) of the various methods described above. Especially, on these specifications, it is the panel which forms the 3rd electrode in the substrate other than the substrate of the electrode which performs maintenance electric discharge which counters, an obstruction is formed only perpendicularly (it is got blocked, intersects perpendicularly with the 1st electrode and th 2nd electrode, and parallel to the 3rd electrode), and it explains based on the reflected type example from which a part of maintenance electrode is constituted by the transparent electrode.

[0005]
[Description of the Prior Art] Drawing 7 is the rough plan of 3 electrodes, field electric discharge, and AC type PDP. Moreover, drawing 8 is the rough cross section (the 1) of 3 electrodes, field electric discharge, and AC type PDP, and shows the cross section of the perpendicular direction in one electric discharge cell of the panel of drawing 7 . Similarly, drawing 9 is the rough cross section (the 2) of 3 electrodes, field electric discharge, and AC type PDP, and shows the rough cross section of this horizontal direction.
[0006] The panel 1 is constituted by two glass substrates. The parallel 1st, X which is the 2nd maintenance electrode, and the Y electrodes 11 and 12 are formed in front-windshield substrate 4a, and these electrodes are constituted by transparent-electrode 6b and bus electrode 6a. Since transparent-electrode 6b has the role which makes the reflected light from a fluorescent substance 5 penetrate, it is formed of ITO (the transparent conductor which makes oxidization in JUMU a principal component film) etc. Moreover, in order that bus electrode 6a may prevent the voltage drops by electrode resistance, it is necessary to form it by low resistance, and it is formed of Cr or Cu. Furthermore, the clothing of them is carried out by the dielectric layer (glass) 7, and the MgO (oxidization MAGUNESHUMU) film 8 is formed in an electric discharge side as a protective coat. Moreover, the address electrode 13 as the 3rd electrode was formed in tooth-back glass-substrate 4b which faces the aforementioned front-windshield substrate 4a in the form which intersects perpendicularly with a maintenance electrode (X, Y electrodes 11 and 12), and the cell 2 is specified to it with the maintenance electrode. Moreover, an obstruction 3 is established between the address electrodes 13, and the fluorescent substanc 5 which has red, green, and a blue luminescence property for the address electrode 13 with a wrap form is formed between the obstruction 3. Two glass substrates are assembled in the ridge of an obstruction 3, and the form which the 8th page of MgO sticks.
[0007] Drawing 10 is the timing diagram of the address / maintenance electric discharge discrete type, and a write-in address system. In the address / maintenance electric discharge discrete type, and the write-in address system, the address period which carries out address electric discharge of a full screen collectively, and the maintenance conducting period which carries out maintenance electric discharge of a full screen collectively are separated. And in the reset period before an address period, on a full screen, a wall charge is once eliminated and a wall charge is alternatively written in according to an indicative data in the address period which follows.
[0008] In this example, one frame is classified into four subfields (SF1, SF2, SF3, SF4), and the ratio of the length of the maintenance conducting period in these subfields is made into the ratio of 1:2:4:8. Brightness is determined by the merits and demerits of a maintenance conducting period, i.e., the number of times of a maintenance pulse, in the address / maintenance ********, and a write-in address system. Therefore, the difference among 16 steps of brightness from 0 to 15 (gradation) is realizable by choosing arbitrarily the subfield made to turn on.
[0009] In addition, the ratio of the length of the maintenance conducting period of each subfield is not necessarily 2n. It is possible for it not to be limited and to set up suitably.
[0010] Next, drawing 11 is the rough block diagram showing the circumference circuit for driving 3 electrodes and AC type PDP, and shows the circumference circuit for driving PDP shown in drawing 7 .
[0011] An address electrode (A1-AM) is connected to the address driver 60 for [ every ], and the address pulse at the time of address electric discharge is impressed by the address driver 60. Moreover, Y electrode (Y1-YN) is individually connected to Y scan driver 50. Y scan driver 50 is connected to the Y side common driver 70, the scanning pulse at the time of address electric discharge is generated from Y scan driver 50, it generates in the Y side common driver 70, and a maintenance pulse etc. is impressed to Y electrode via Y scan driver 50. Over all the display lines of a panel 1, it connects in common and X electrode is taken out. The X side common driver 40 generates a write-in pulse, a maintenance pulse, etc.
[0012] These driver circuits are controlled by th control circuit 20, and a control circuit 20 is controll d by synchronizing signals inputted from the exterior of equipment, such as Vsync (vertical synchronizing signal) and Hsync (horizontal synchronizing signal), and DATA (indicative

data) and CLOCK (dot clock). The control circuit 20 was equipped with the frame memory 211, and is equipped with the indicative-data control section 21 for controlling the address driver 60, and the panel drive control section 22 for controlling other drivers. The panel drive control section 22 is equipped with the common driver control section 222 which controls the scanning driver control section 221 for controlling Y scan driver 50 further, and the Y side common driver 70 and the X side common driver 40. Moreover, the drive wave outputted from these drivers is memorized by the drive wave pattern ROM 30.

[0013] Drawing 12 is the drive wave form chart showing the first conventional technology. In this drawing, 1 subfield period in so-called conventional address / maintenance conducting period discrete type, and write-in address system is shown, and one subfield is divided into a reset period and an address period pan by the maintenance conducting period.

[0014] In a reset period, first, all Y electrodes are made into 0V level, simultaneously, the complete write-in pulse which becomes X electrode from voltage Vs+Vw (about 360 V) is impressed, and it is not concerned with a former display state, but electric discharge is performed in all the cells of all display lines. The address electrode potential at this time is about 100V (Vaw). Next, the potential of X electrode and an address electrode is set to 0V, and electric discharge is started for own voltage of a wall charge exceeding breakdown voltage in all cells. In order that this electric discharge may not have the inter-electrode potential difference, a wall charge is not formed, space charge carries out self-neutralization and electric discharge ceases. It is the so-called self-elimination electric discharge. By this self-elimination electric discharge, the state of all the cells in a panel will be in the uniform state where there is no wall charge. Irrespective of the lighting state of a front subfield, this reset period has the operation which changes all cells into the same state, and can perform the next address (writing) electric discharge stably.

[0015] Next, in an address period, in order to perform ON/OFF of a cell according to the indicative data, address electric discharge is performed by line sequential. First, while impressing the scanning pulse of -Vy level (abbreviation minus 150V) to Y electrode The address pulse of voltage Va (about 60 V) is alternatively impressed to the address electrode corresponding to the cell which causes maintenance electric discharge, i.e., the cell made to turn on, among an address electrode. Electric discharge takes place between the address electrode of the cell made to turn on, and Y electrode, and, next, it ****** by making this into a priming (pilot flame) to X electrode (voltage Vx=50V) and Y inter-electrode electric discharge. The former electric discharge is called "priming address electric discharge", and the latter is called "main address electric discharge." Thereby, the wall charge of the amount in which maintenance electric discharge is possible is accumulated, and a lighting (ON) cell is formed in the MgO side on X electrode of the selection cell of a selection line, and Y electrode.

[0016] Hereafter, one by one, about other display lines, same operation is performed and the writing (formation of a lighting cell) of a new indicative data is performed in all display lines.

[0017] Then, if it becomes a maintenance conducting period, by turns, the maintenance pulse which voltage becomes from Vs (about 180 V) will be impressed, maintenance electric discharge will be performed to Y electrode and X electrode in a lighting cell, and image display of one subfield will be performed to them.

[0018] the electric discharge cell which was not turned on in the last subfield with the electric discharge cell turned on in the last subfield in the reset period in the first conventional example -- whenever -- subfield electric discharge is carried out Since the case of the cell of the gradation value 0, i.e., the cell expressing black, will also discharge several times in one frame in this case, the fall of contrast will be caused.

[0019] Drawing 13 is the drive wave form chart showing the second conventional technology, and shows the drive wave based on the driving method (Japanese Patent Application No. No. 113773 [ 11 to ]) invented by these people.

[0020] By this driving method, while impressing the narrow width pulse which becomes X electrode from voltage Vs in a reset period, only the lighting (ON) cell in a front subfield performs reset lectric discharge, and is made not to perform reset electric discharg of an astigmatism LGT cell by impressing the **** elimination pulse which consists of voltage Vs

succeedingly.
[0021] A **** elimination pulse (SEP:Slope Erase Pulse) is a pulse from which applied voltage changes with time, and since the voltage impressed to inter-electrode increases gradually, immediately after inter-electrode potential including the potential difference by the wall charge exceeds the breakdown voltage in each cell, electric discharge produces it. Therefore, unlike the time of a square wave being impressed, inter-electrode potential when electric discharge arises in each cell is almost equal to breakdown voltage, and electric discharge ends it, without accumulating a new wall charge after electric discharge. Since electric discharge arises by superposition of the applied voltage to a remains wall charge in the cell in which a wall charge remains and applied voltage does not reach breakdown voltage in other cells by what applied voltage by the **** elimination pulse is made under into breakdown voltage for, electric discharge does not arise.
[0022] In the electric discharge cell by which the light is not switched on by the last maintenance conducting period, and the wall charge does not remain in the reset period by this technique, since electric discharge is not performed fundamentally, high contrast is realizable with application of this wave.
[0023] Furthermore with the second conventional technology, two **** elimination is carried out in the reset period. Since, as for the former, elimination is mainly performed with the electric discharge as the starting point between XY(s), since elimination is mainly performed with the electric discharge as the starting point between AY(s), "XY elimination ****" and the latter call "AY elimination ****." Although only a lighting (ON) cell [ in / a front subfield / as mentioned above / in the former ] performs reset electric discharge, it is the feature that the latter is also performing elimination in an astigmatism LGT cell partially. That is, also in an astigmatism LGT c ll, the wall charge of a minute amount may be accumulated in response to the influence of a surrounding lighting cell, and a malfunction may be produced. In the latter AY elimination ****, it has the effect which eliminates such a minute amount wall charge. The address period carried out succeedingly and the maintenance conducting period are the same as that of the case of the first conventional technology explained by drawing 12 .
[0024] In addition, in the case of the second conventional technology, there is a fault that proper driver voltage width of face is narrow. then, the technique of considering as the technique of combining the first and the second conventional technology and the drive wave specifically according to the first conventional example in some Naka (for example, the first subfield) of all subfields, and making the remaining subfield the drive wave by the second conventional technology is desirable in fact
[0025]
[Problem(s) to be Solved by the Invention] drawing 14 is the drive wave and wall charge change of the second conventional technology, and explains change which is in the wall charge state in the second above-mentioned conventional technology There are SFn which are arbitrary subframes, and SFn+1 which are located in the degree, and it consists of a reset period, an address period, and three periods of a maintenance conducting period from this view, respectively.
[0026] "Reversal" in drawing is accumulating a lot of wall charges before electric discharge, and a lot of [ reversed polarity ] wall charges are accumulated electric discharge before after electric discharge here, "Elimination" is accumulating a lot of wall charges before electric discharge. in the state of having no wall charge or little accumulation after electric discharge A bird clapper, Before electric discharge, it is little accumulation and "formation" means having no wall charge or that accumulating a lot of wall charges after electric discharge and a "minute amount charge storage" accumulate the wall charge of a minute amount under the influence of maintenance electric discharge of an vertical and horizontal lighting cell as the second conventional technology explained. "-" does not produce electric discharge but means that there is no change of a wall charge before and behind a wave.
[0027] Moreover, Vfe is the minimum valu of the electrode applied voltage which starts electric discharge, and changes in many cases with wall charge states of dispersion in a cell, or a cell. Vfe is the cell which is an average value and "usually, the cell of Vfe" is in a wall charge state

which does not start electric discharge even if a scanning pulse is impressed in an address period in the case of un-choosing. That is, the following formulas are usually realized about Vfe.
[0028] Usually, Vfe>Vx - (-Vy)
On the other hand, "a cell low [ Vfe ]" is in a wall charge state which starts electric discharge, when a scanning pulse is impressed, although Vfe is a low cell and did not choose from the average in the address period. Therefore, the following formulas are realized about low Vfe.
[0029] Low Vfe<Vx - (-Vy)
In a lighting cell, whenever maintenance electric discharge is performed by Subfield SFn, a wall charge is reversed, and Subfield SFn is completed, with a polar predetermined wall charge remained. In the reset period of subfield SFn+1 which follows, elimination electric discharge by the narrow width elimination pulse and the **** elimination pulse is performed. At this time, a wall charge is once eliminated. A wall charge is alternatively formed in the address period of after that SFn+1, and wall charge reversal is again repeated by the maintenance conducting period.
[0030] Usually, in the astigmatism LGT cell of Vfe, since maintenance electric discharge is omitted by Subfield SFn, a wall charge does not remain, and as for electric discharge, the reset period of subfield SFn+1 which follows is not performed, either. Supposing it does not perform address electric discharge in the continuing address period, as for electric discharge, a subsequent maintenance conducting period will not be performed, either. That is, it did not discharge from beginning to end.
[0031] Since maintenance electric discharge is omitted by Subfield SFn also in the astigmatism LGT cell (unusual cell) of low Vfe, it must be in the state which does not have remains of a wall charge at this time. However, in response to the influence from a contiguity cell, a wall charge may be gradually accumulated to the maintenance conducting period of SFn in practice (minut amount wall charge storage). With the second conventional technology, as mentioned above, in order to eliminate this minute amount wall charge with AY elimination ****, prevention of the malfunction resulting from a minute amount wall charge is expected.
[0032] However, even if AY elimination **** was used for the cell with bad cell conditions, not to mention it was not eliminated, it made it clear that strong electric discharge is induced and reversal formation of the wall charge may be carried out. Since it results in the repeat electric discharge by the maintenance conducting period and becomes incorrect lighting of an astigmatism LGT cell after this, incorrect lighting of an astigmatism LGT cell serves as remarkable deterioration of display quality.
[0033] this invention aims at offering the drive method that incorrect lighting of an astigmatism LGT cell can be prevented in the drive method of the plasma display panel which has the reset period which carries out alternative elimination of the lighting cell in a front subfield.
[0034]
[Means for Solving the Problem] By the drive method of the plasma display panel by the claim 1 While the 1st and 2nd concurrent electrodes adjoin mutually and are arranged, [ two or more ] this -- with the reset period for two or more 3rd electrode being arranged so that the 1st and 2nd electrodes may be intersected, and coming to arrange the electric discharge cell specified in the intersection field of each electrode in the shape of a matrix, and making uniform the wall charge distribution of two or more of these electric discharge cells The address period which accumulates a wall charge in arbitrary electric discharge cells according to an indicative data, and forms a lighting cell, It has the maintenance conducting period which maintenance electric discharge is carried [ conducting period ] out in this lighting cell, and makes this lighting cell turn on. It is the drive method of the plasma display panel which displays by repeating and performing this reset period, an address period, and a maintenance conducting period. the aforementioned reset period The first electric discharge process which discharges in the electric discharge cell which is an astigmatism LGT in the last maintenance conducting period, and is accumulating the wall charge, It discharges in the electric discharge cell which is accumulating the wall charge after the electric discharge process of the above first, and the second electric discharge process which eliminates this wall charge is included. the electric discharge process of the above first Are the wall charge and reversed polarity which are accumulated at the aforementioned lighting cell turned on in the last maintenance conducting period, and under by the breakdown

voltage in an electric discharge cell and it can set during the aforementioned address -- this -- the voltage beyond the 1st and 2nd inter-electrode potential difference -- this -- it is made to be impressed by inter-electrode [ the 1st and 2nd ]
[0035] With the second conventional technology, it was not eliminated by AY elimination **** which should originally perform elimination operation of a minute amount wall charge, but it became clear that a wall charge will be formed. Then, in this invention in connection with a claim 1, since it is made to discharge greatly at once to such an unusual astigmatism LGT cell and a wall charge is intentionally stored up by impressing a new electric discharge pulse (it being henceforth called OC pulse) in advance of elimination ****, it is made to perform the same elimination operation as a lighting cell.
[0036] Drawing 1 is the principle view of this invention wave which makes only an astigmatism LGT (OFF) cell discharge.
[0037] The lighting cell has repeated maintenance electric discharge in the maintenance conducting period by the sum of electrode applied voltage and wall charge voltage. In drawing 1 , since the last maintenance electric discharge wave is impressed to X electrode, the wall charge at the time of a maintenance conducting period end (notionally all over drawing four wall charges) is the polarity of plus at minus and Y electrode in X electrode. Since OC pulse of this invention has the positive pulse impressed to X electrode, and the negative pulse impressed to Y electrode, inter-electrode applied voltage is reduced by the remains wall charge at the time of a maintenance conducting period end and inter-electrode potential does not reach breakdown voltage, the electric discharge by impression of OC pulse is not produced.
[0038] Usually, since maintenance electric discharge is not performed in a maintenance conducting period, the astigmatism LGT cell of Vfe is in the state which does not usually have a wall charge. Since the applied voltage by OC pulse of this invention is set under to breakdown voltage, the influence by the remains wall charge also exists, and is twisted, and the astigmatism LGT cell of Vfe does not usually produce electric discharge in impression of OC pulse of this invention.
[0039] Although the astigmatism LGT cell of low Vfe is originally also in a state without a wall charge since maintenance electric discharge is not performed in a maintenance conducting period, it is influence of electric discharge of an vertical and horizontal lighting cell, and may have the wall charge (notionally all over drawing one wall charge) of a minute amount. The wall charge at this time is the polarity of the minus at plus and Y electrode to X electrode. OC pulse of this invention has the positive pulse impressed to X electrode, and the negative pulse impressed to Y electrode, and applied voltage is added by the remains wall charge at the time of a maintenance conducting period end. When there are many amounts of wall charges of a minute amount, in order that inter-electrode potential may exceed breakdown voltage, electric discharge is performed by OC pulse of this invention, and a wall charge is formed. Since this cell will have the almost same wall charge as the usual lighting cell at this time, elimination is completely performed by the elimination electric discharge in a subsequent reset period.
[0040] By the above process, the discharge of the astigmatism LGT cell generated with the second conventional technology can be prevented.
[0041]
[Embodiments of the Invention] Hereafter, the suitable operation gestalt which applied this invention is explained in detail, referring to a drawing.
(First operation gestalt) Drawing 2 shows the drive wave and wall charge change of the first operation gestalt. This example is most fundamental example of a wave of this invention, and is an example which inserted the OC pulse 1 of this invention between the maintenance conducting period and the conventional reset period.
[0042] With this operation gestalt, the OC pulse 1 which makes only the astigmatism LGT cell of low Vf discharge is established between the maintenance conducting period and the reset period. The OC pulse 1 is the wave of the shape of a squar wave aiming at formation of a reversal wall charge, and is setting potential of X electrode of this wave, and Y electrode to the respectively same Vx as the time of scanning pulse impression of an address period, and -Vy.
[0043] With this operation gestalt, while electric discharge arises in the astigmatism LGT cell of

low Vfe by impression of the OC pulse 1, the wall charge which polarity reversed after electric discharge is formed. Since the wall charge state of a low Vfe cell becomes almost th same as that of the wall charge state in a lighting (ON) cell at this time, a remains wall charge is eliminated by alternative elimination electric discharge in a reset period conventionally which follows.
(Second operation gestalt) Drawing 3 shows the drive wave and wall charge change of the second operation gestalt.
[0044] With the first operation gestalt, after the wall charge electric discharge by the OC pulse 1, although the cells which cannot eliminate a remains wall charge completely by the conventional reset are few, they exist. Therefore, it is more desirable to eliminate conventionally the minute amount wall charge accumulated at the astigmatism LGT cell before reset.
[0045] Then, let the wave of the OC pulse 2 be the **** elimination pulse which can perform wall charge elimination with this operation gestalt. The last attainment potentials of X electrode by this **** elimination pulse and Y electrode are the respectively same Vx as the time of scanning pulse impression of an address period, and -Vy.
[0046] With this operation gestalt, it is operation divided into two kinds, "a cell eliminable [ with the OC pulse 2 ]" and "the cell conventionally eliminated in a reset period although it will be reversed by the OC pulse 2." That is, in the second operation gestalt, the cell which polarity r versed, without giving an elimination function to the OC pulse 2, eliminating a minute amount wall charge to some extent, and being able to eliminate by the OC pulse 2 is conventionally eliminated in a reset period.
(Third operation gestalt) Drawing 4 shows the drive wave and wall charge change of the third operation gestalt.
[0047] With this operation gestalt, the last attainment potential of X electrode by the OC puls 3 and Y electrode is changed by alpha to the respectively same Vx as the time of scanning pulse impression of an address period, and -Vy. For example, when alpha is positive, it becomes the bigger potential difference than the time of scanning pulse impression, and when alpha is negative conversely again, it becomes the potential difference smaller than the time of scanning pulse impression. alpha -- positive/negative -- thereby, it becomes possible [ making elimination capacity of the OC pulse 3 of this invention larger than the thing of other operation gestalten ] anyway which is good, although it changes with panel conditions, inclinations of the OC pulse 3 of this invention, etc. However, the applied voltage by the OC pulse 3 needs to set up so that the breakdown voltage of a cell may not be fulfilled. It is because contrast will fall sharply since electric discharge usually arises also in the astigmatism LGT cell of Vfe, if applied voltage is over breakdown voltage. The point which makes the OC pulse 3 the **** elimination pulse is the same as the second operation gestalt.
(Fourth operation gestalt) Drawing 5 shows the drive wave and wall charge change of the fourth operation gestalt.
[0048] This operation gestalt is the example which inserted the OC pulse 4 of this invention into the maintenance conducting period. Although the principle of operation is the same as the first operation gestalt, only one loop performs wall charge reversal operation by maintenance electric discharge after wall charge formation by the OC pulse 4 of this invention. In addition, since it is made to add a maintenance pulse to one loop, i.e., X, and Y electrode by a unit of 1 time, maintenance electric discharge becomes the same [ the polarity of the remains wall charge at the time of the conventional reset start ] as that of the thing of the first operation gestalt.
[0049] With the first operation gestalt, the cell which is not completely eliminable by the conventional reset exists slightly after the wall charge electric discharge by the OC pulse 1 as mentioned above. With this operation gestalt, maintenance electric discharge is performed at once after the wall charge formation by the OC pulse 4, and elimination in a reset period is conventionally made perfect by changing into the completely same wall charge state as a lighting cell. In addition, the wave of the OC pulse 4 itself is the same as that of the thing of the OC pulse 1 in the first operation gestalt.
[0050] above-mentioned first - each OC pulse in the fourth operation gestalt can be carried out only by change of a drive wave pattern program, and can apply the circuit of the conventional

technology as it is it is realizable by specifically changing the data of the drive wave pattern ROM 30 which looks like [ drawing 11 ] and can be set However, in the case of the third operation gestalt, in addition to change of a drive wave pattern program, the new circuit for Vx+alpha and - Vy-alpha is needed.

[0051] Drawing 6 is the common driver detail drawing for driving 3 electrodes and AC type PDP, and shows the example of the Y side common driver 70 in drawing 11 , and the X side common driver 40.

[0052] In this example, in the Y side common driver 70, it annexed to the power circuit which was generating -Vy **** conventionally, and the thing for - Vy-alpha **** is prepared. Similarly, by the X side common driver 40, it annexed to the power circuit which was generating Vx **** conventionally, and the thing for Vx+alpha **** is prepared.

[0053] If the operation form explained above is taken into consideration, it is also possible to add th requirements indicated further below to each claim of this invention in addition to the present requirements.

1. The electric discharge process of the above first should include the 1st pulse impressed to the 1st electrode, and the 2nd pulse impressed to the 2nd electrode.

2. It is that the applied voltage by the 1st pulse of the above is equal to the voltage impressed to this 1st electrode in the aforementioned address period, and the applied voltage by the 2nd pulse of the above is equal to the selection potential impressed to the 2nd electrode in the aforementioned address period.

3. The above 1st and the 2nd pulse should be **** pulses from which applied voltage changes with time.

4. Carry out even maintenance electric discharge between the electric discharge process of the above first, and the electric discharge process of the above second.

[0054] Of course, the requirements for the above 1-4 do not limit the main point of the present claim 1.

[0055]

[Effect of the Invention] As explained above, since the wall charge of the minute amount accumulated at the cell of low Vfe in the drive method of the plasma display panel which has the reset period which carries out alternative elimination of the lighting cell in a front subfield in this invention is certainly eliminable, incorrect lighting of an astigmatism LGT cell can be prevented, and it becomes possible to raise display quality remarkably.

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3.In the drawings, any words are not translated.

## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the principle view of this invention wave which makes only an astigmatism LGT cell discharge.
[Drawing 2] It is drawing showing the drive wave and wall charge change of the first operation g stalt.
[Drawing 3] It is drawing showing the drive wave and wall charge change of the second operation gestalt.
[Drawing 4] It is drawing showing the drive wave and wall charge change of the third operation gestalt.
[Drawing 5] It is drawing showing the drive wave and wall charge change of the fourth operation gestalt.
[Drawing 6] It is the common driver detail drawing for driving 3 electrodes and AC type PDP.
[Drawing 7] It is the rough plan of 3 electrodes, field electric discharge, and AC type PDP.
[Drawing 8] It is the rough cross section (the 1) of 3 electrodes, field electric discharge, and AC type PDP.
[Drawing 9] It is the rough cross section (the 2) of 3 electrodes, field electric discharge, and AC type PDP.
[Drawing 10] It is the timing diagram of the address / maintenance electric discharge discrete type, and a write-in address system.
[Drawing 11] It is the rough block diagram showing the circumference circuit for driving 3 electrodes and AC type PDP.
[Drawing 12] It is the drive wave form chart showing the first conventional technology.
[Drawing 13] It is the drive wave form chart showing the second conventional technology.
[Drawing 14] It is drawing showing the drive wave and wall charge change of the second conventional technology.
[Description of Notations]
1 Panel
2 Cell
3 Obstruction
4a Front-windshield substrate
4b Tooth-back glass substrate
5 Fluorescent Substance
6a Transparent electrode
6b Bus electrode
7 Dielectric Layer
8 MgO Layer
11 X Electrode
12 Y Electrode
13 Address Electrode
20 Control Circuit
21 Indicative-Data Control Section

211 Frame Memory
22 Panel Drive Control Section
221 Scanning Driver Control Section
222 Common Driver Control Section
30 Drive Wave Pattern ROM
40 The X Side Common Driver
50 Y Scan Driver
60 Address Driver
70 The Y Side Common Driver

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[Translation done.]